

MUNICIPAL WATER RATES IN CANADA

CURRENT PRACTICES AND PRICES

Environnement
Canada

Canada

Environment Canada undertook a study of water pricing practices and existing price data were obtained from the data base, which contains the 1986 schedules for 470 Canadian municipalities. Residential and commercial rates were

disclosed five main facts about municipal

1. In Canada, water rate schedules are extremely varied. Each municipality has its own set of rates, with some having more than one rate schedule. The study included municipalities that have 100 separate rate schedules pertaining to residential and commercial customers.

2. The most common type of rate schedule in effect is the block rate (either as the sole form of pricing, or as a block rate schedule in which the first minimum bill applies to the majority of

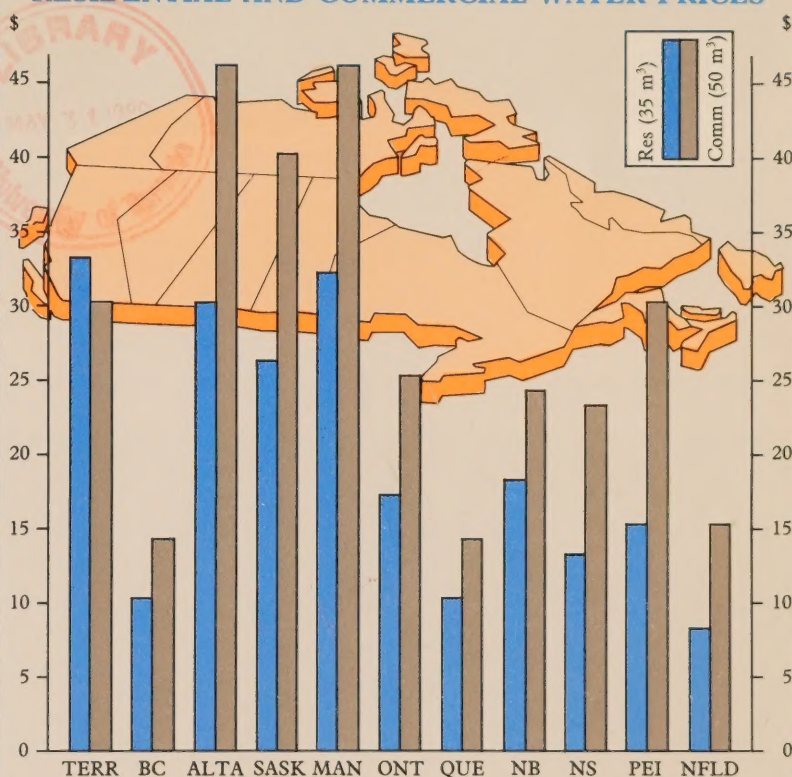
3. Of the rate schedules provided either no incentive to conserve water (i.e. with flat rates) or decreasing incentive for conservation (declining block rates).

4. The mean price to a consumer for water per month (the average family size) varies from a low of \$7.97 in Newfoundland to a high of \$31.91 in Manitoba. In general, the better the quality and availability of water, the lower the price.

5. Current rate making practices fail to meet the test of cost recovery, equity, and economic efficiency. The prime criterion involved in setting rates appears, instead, to be acceptability to ratepayers, accompanied by a varying concern for conservation.

The study noted that the special requirements of urban and rural consumers were not fully considered in the study. Also, the costs of the water system and the licence fees charged by municipalities for water abstraction were not fully considered. As the study does not explore water economics in depth, the comparative price analysis is insufficient, by itself, to permit conclusions about an effective pricing structure for municipal water.

RESIDENTIAL AND COMMERCIAL WATER PRICES



Mean monthly price (including water and sewage services) for average customer.

Definitions

Water rate: The schedule of charges set by municipalities as the basis of water charges to consumers. Both water supply and waste treatment charges are included.

Block rate: The charge set for a specific volume (or 'block') of water. There can be several blocks of different size in a rate structure.

Total water price: The bill charged to consumers for all the water used per month, including both water and sewage services.

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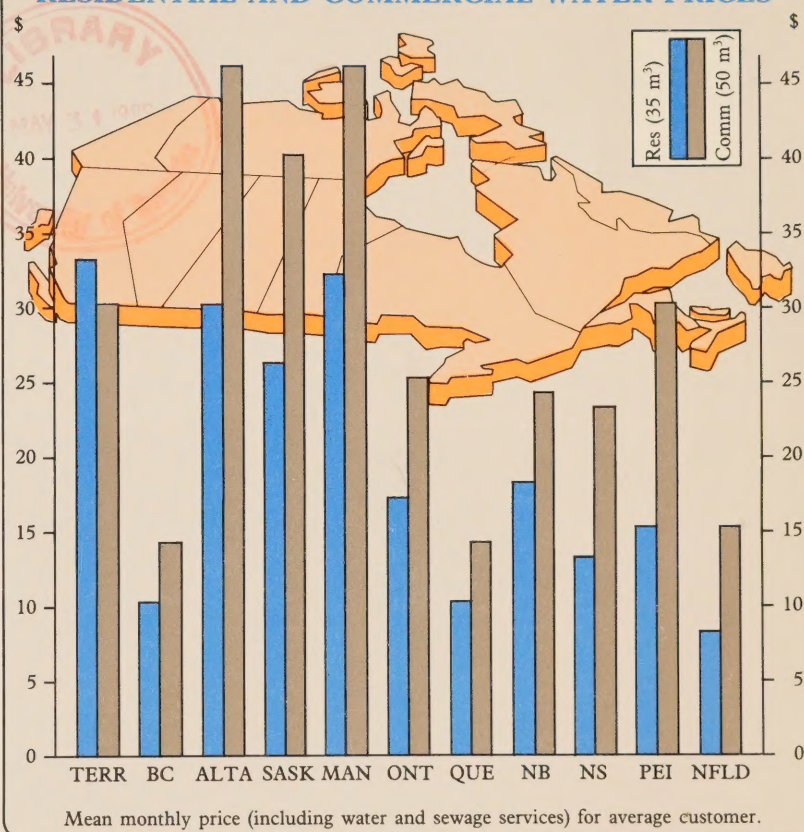
In 1987, Environment Canada undertook a study of municipal water pricing practices and existing rate schedules. Price data were obtained from the WATPRICE data base, which contains the 1986 water rate schedules for 470 Canadian municipalities. Only the residential and commercial rates were included.

The study disclosed five main facts about municipal water pricing:

- Across Canada, water rate schedules are extremely diverse. Each municipality has its own set of rates, usually consisting of more than one *rate schedule*. The 470 municipalities included in the study have more than 1,100 separate rate schedules pertaining to residential and commercial customers.
- The most common type of rate schedule in effect is the *flat rate* (either as the sole form of pricing, or as part of a block rate schedule in which the first block or a minimum bill applies to the majority of customers).
- About 71% of the rate schedules provided either no financial incentive to conserve water (i.e. with flat rates) or a decreasing incentive for conservation (i.e. with declining block rates).
- Provincially, the mean price to a consumer for 35 m³ of water per month (the average family consumption) varies from a low of \$7.97 in Newfoundland to a high of \$31.91 in Manitoba. In general, the better the quality and availability of water sources, the lower the price.
- In general, rate making practices fail to meet the criteria of cost recovery, equity, and economic efficiency. The prime criterion involved in setting water rates appears, instead, to be acceptability to local ratepayers, accompanied by a varying concern for cost recovery.

It should be noted that the special requirements of industrial and rural consumers were not considered in the study. Also, the costs of the distribution system and the licence fees charged by some provinces for water abstraction were not examined extensively. As the study does not explore water utility economics in depth, the comparative analysis it presents is insufficient, by itself, to permit the drawing of conclusions about an effective pricing system for municipal water.

RESIDENTIAL AND COMMERCIAL WATER PRICES



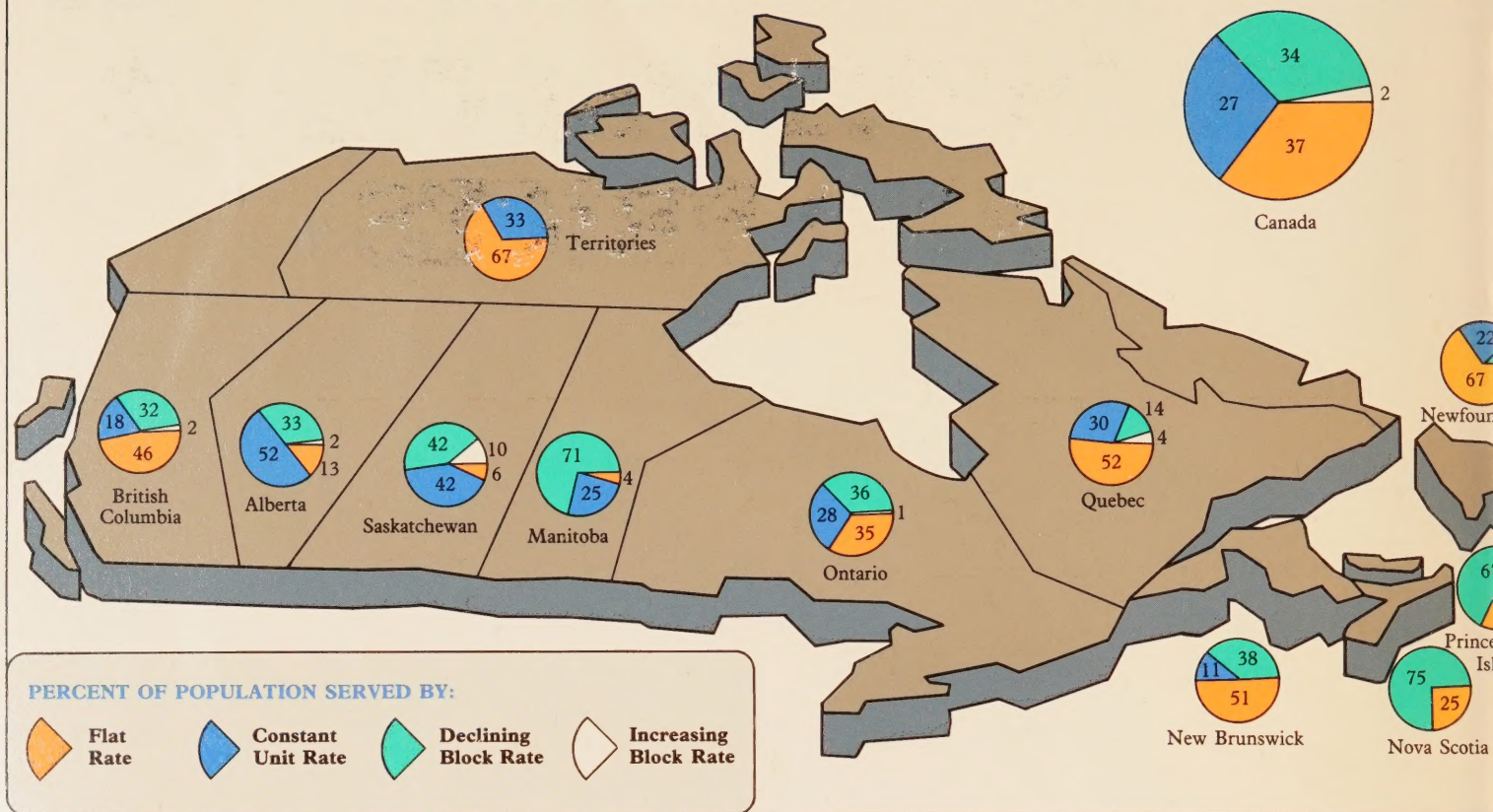
Definitions

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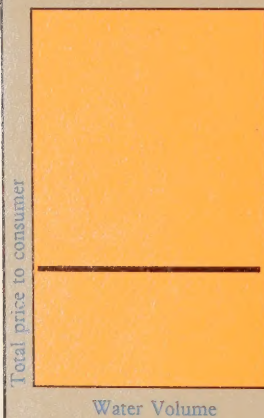
MUNICIPAL RATE STRUCTURES: EXTREMELY DI



TYPICAL WAYS OF PRICING WATER

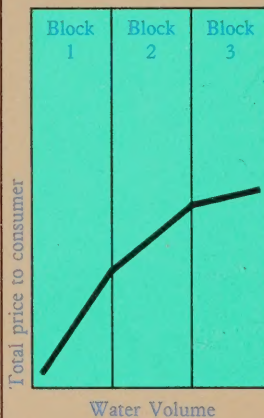
FLAT RATE

The flat rate and its variants, such as rates based on property assessment, are the predominant type of water rate used in Canada. In each billing period, a fixed charge is levied regardless of the volume of water used. Within a municipality, this charge may vary according to certain "user classes". This type of rate is easy to administer and easily understood by the customer. However, the flat rate actually promotes excessive water demand, because the price of each additional unit of water consumed is zero. Customers have no incentive to curb water use, and the municipality has little control over demand, except through measures such as lawn-watering restrictions.



DECLINING BLOCK RATE

The most common of the volume-based water rates in Canada is the declining block rate. Declining block rate schedules charge a successively lower price for set volumes of water as consumption increases through a series of "blocks". In other words, the bill to the consumer (total price) climbs much slower at the higher volumes of water used. Typically, the first or the first and second blocks cover residential and light commercial water use. Subsequent blocks cover heavier commercial and industrial uses. Declining block rates provide a decreasing incentive to conservation, because additional units of water decline in cost.



71% Pay Rates That Do Not Promote Conservation

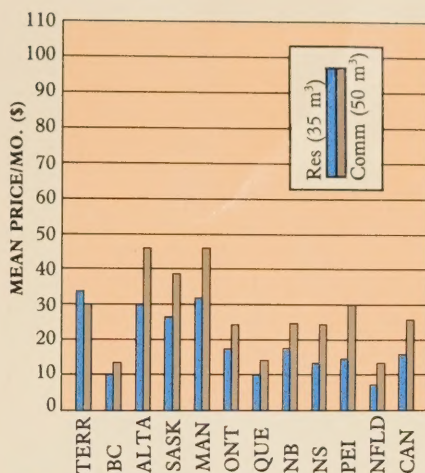
If we look at the actual populations served by the various types of water rate schedules contained in the WATPRICE data base, we find that 71% of the sample have rate structures that either discourage (flat rate) or do not actively promote (declining block rate) water conservation. About 37% of the population are charged a flat rate and 34% are charged a declining block rate; both of these discourage water conservation. Conservation is encouraged by the constant unit rate (27%) and the increasing block rate (1.5%).

Source: *Municipal Water Rates in Canada, 1986 — Current Practices and Prices*, Social Science Series No. 21, Inland Waters Directorate, Environment Canada, 1989.

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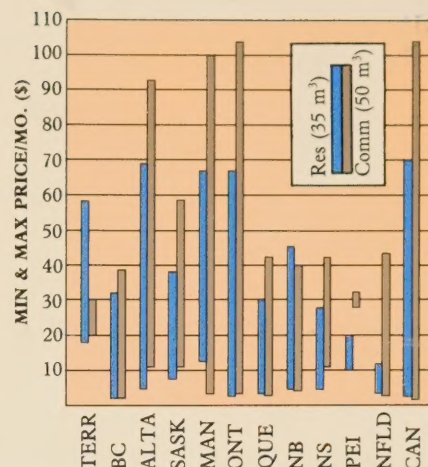
There were just over 1,100 residential and commercial rate schedules found in the data base for the 470 municipalities under consideration. This represented an average of between two and three rate schedules per municipality. The maximum number of rate schedules in one municipality was 11.

The water rate schedules in the WATPRICE data base were derived from a 1986 survey of all municipalities with a population over 5,000, together with a 10% sample of those with populations between 1,000 and 5,000 (about 800 municipalities in total). The survey produced usable results for 470 of the 800 municipalities surveyed. Of the remaining 330 municipalities, 150 did not respond, while an additional 180 had rate schedules which could not be analyzed systematically because they were unique in some way, with respect to their water pricing practices. Examples of this are where water rates were based on property assessment, or upon other specific household features (no. of taps, etc). About 15.7 million people, or 78% of Canada's total urban population in 1986, resided in the 470 municipalities considered in the study.



Price Of Water Varies Greatly Across Canada

The variation in the price of water from province to province partially reflects the average cost of providing service. Where cost advantages exist such as abundant supply, availability of gravity-fed systems, and generally good ambient quality, rates are lower, as in Newfoundland, British Columbia and Quebec. Where water shortages are frequent or distribution is problematic, rates are higher, as in the Prairie provinces and the Territories.



Water Prices Vary Greatly Within Provinces

Even within a province, water prices vary dramatically. Prices are set municipally and seem to depend chiefly on local acceptability and competitiveness with other municipalities. Prices do not seem to be related to community size: that is, prices do not significantly decrease as system size increases. If economies of scale occur, they are not translated into lower consumer prices—likely because the provinces provide higher subsidies to smaller communities in the interests of equity. But despite the spread between the highest and the lowest prices, lower prices predominate. Median water prices tend to fall below the corresponding means, indicating a bias towards lower rates.

CONSTANT RATE

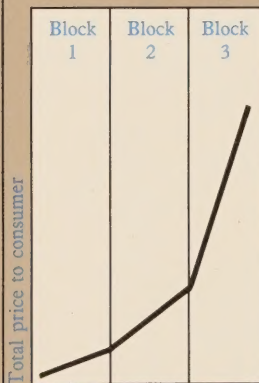
Another type of volume-based rate is the constant unit rate. Under this type of schedule, the consumer pays a fixed price for each unit (e.g. cubic metre) of water consumed. The bill to the consumer climbs uniformly with the volume used. Besides being somewhat more equitable than either the flat or declining block rate (because higher volume users pay for each additional unit of water consumed), a constant unit rate provides a significant incentive to conserve water.



Water Volume

INCREASING BLOCK RATE

The increasing block rate works in essentially the same way as the declining block rate, except that the price of the water in successive blocks increases rather than declines. The consumer's bill rises faster with higher volumes of water used. The largest consumers of water, who are usually responsible for the on-going demand or the peak flows that dictate the size of municipal water systems, pay proportionately more. Increasing rates not only encourage conservation, they actually penalize higher consumption. Very few Canadian water rates follow this pattern.

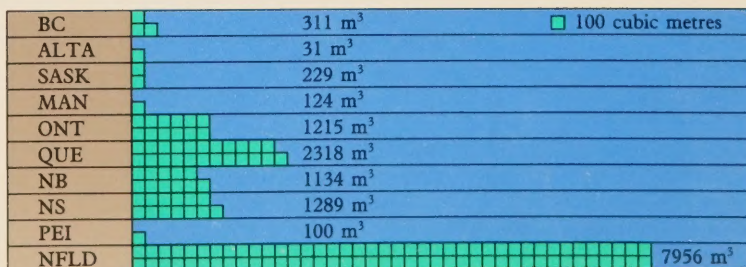


Water Volume

IMPORTANCE OF FIRST BLOCK

In many communities with a block rate structure, the initial block is paid for by a minimum bill per customer, and includes a given volume of water. Sometimes this volume is so large that the consumer in effect has the benefit of a flat rate. Provincially, the average size of this first block varied from a low of about 31 m³ in Alberta to a high of about 8,000 m³ in Newfoundland. Variations in subsequent blocks were equally large. In general, larger block sizes tended to be found in larger communities, suggesting that these blocks were designed to accommodate larger industrial consumers in those communities.

Average Volume Of First Block



WHY DO CURRENT PRICING PRACTICES VARY SO MUCH?

Establishing water rates in Canada is influenced by a number of different, and sometimes conflicting, criteria.

Cost recovery is normally considered the prime goal for rate setting. However, it appears that not all costs have been fully accounted for in establishing water rates.

Equity, in the sense of sharing system costs in a "fair" manner amongst users, is another typical explanation for adopting a particular rate schedule. But equity analyses are difficult to conduct and so-called "equitable" rates may prove inequitable on further analysis.

At the present time, arguments for economic efficiency do not carry much weight in the process of rate setting. Nevertheless, economic analysis can be extremely useful in diagnosing many of the current problems afflicting water rates today.

Overriding all of these factors is the acceptability to ratepayers of the local rate schedule. All of these considerations take myriad forms and result in a multitude of different rates, not only across the country, but often within a single municipality.

AN ASSESSMENT OF CURRENT RATE SETTING PRACTICES

Cost Recovery

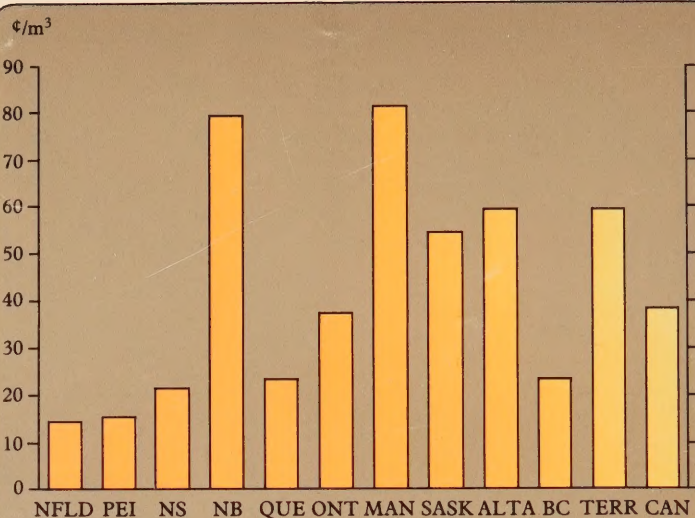
Municipal water rates are normally established by municipal councils, which must meet the perceived needs of constituents. As a result, additional considerations beyond cost recovery and equity come into play in the rate-setting process. There may be a perceived need to remain "competitive" compared to surrounding municipalities in order to attract industry. Decisions may be made to postpone necessary rate increases until the political or economic climate is more favourable. Or certain types of rate schedules may be adopted in order to give the appearance of equity. Cost considerations of this type are significant in explaining how water is priced in many Canadian communities.

A 1985 report on water systems prepared for the Federation of Canadian Municipalities indicated that 82% of water supply, 85% of water distribution, 50% of sewage collection, and 65% of waste water treatment costs were currently being covered by the user charges collected through water rates. The remainder was said to be covered by mechanisms such as lot levies, general property taxes, transfers from other levels of government, and increased debt. Nevertheless, there is today a "crisis" in municipal water funding as expressed by various municipal leaders across Canada. It would seem that, contrary to the 1985 report, users have for some years been shielded from directly assuming the full costs of maintaining water systems.

Equity

Many municipal rate makers attempt to achieve equity or fairness in setting municipal water rates. While equity is a laudable theoretical concept, it is difficult to define in practice and is open to a variety of interpretations by the many bodies that set water rates.

For example, equity has been used both to justify flat rates (i.e. all customers in a user category are treated "equally"), and to justify declining block rates (i.e. fixed costs are borne by all customers as higher rates in the first few blocks, while only the costs of treatment, pumping, and sewerage need be recovered from customers who use higher volumes). There are many other interpretations.



MARGINAL PRICE OF WATER TO RESIDENTIAL USERS

The marginal price of water is defined here as the cost of an extra cubic metre of water at the 35 m³ level of usage. This is an approximate measure of the value currently placed on municipal water, and varies from a low of 14 cents in Newfoundland to a high of 81 cents in Manitoba. The average for all of Canada is 38 cents.

But what sounds equitable at first may not stand up under further analysis. For example, under flat rate schedules, customers who conserve water are the ones who pay for the excessive demands of those who waste it. And in the case of declining block rate systems, a municipality may be forcing all users to pay higher fixed costs to supply a relatively few high-volume users.

Thus, while rate makers aim at equitable rates, in fact this objective is seldom met.

Economic Efficiency

Without venturing deeply into theory, economic efficiency means achieving a given objective at least cost. This happens when the price of the commodity equals the cost incurred in supplying the next, additional user. In other words, price should equal *marginal cost*. Furthermore, all users should face this same price. If these conditions are met, service occurs at minimum cost, customers are treated equally, system repair and upgrading are adequately covered, and system expansion occurs only when demand calls for it. Because the customer is adequately informed about the true costs of water services, water demand occurs efficiently at the least cost to society.

Flat rates for water imply a marginal cost of zero. Water becomes a "free" commodity and is subject to overuse and the consequent artificially high system cost. Declining block rates imply that the marginal cost decreases in the higher blocks. This might be true of a static situation, but is almost certainly false through time, as upgrading and expansion costs are incurred.

In summary . . .

Rate making practices fail to meet the criteria of cost recovery, equity, and economic efficiency. The prime criterion involved in setting water rates appears, instead, to be acceptability to local ratepayers, accompanied by a varying concern for cost recovery.



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